



## Research article

# Feasibility and acceptability of a culturally-adapted Women's Wellness After Cancer Programme for Chinese women treated for gynaecological cancer: A pilot randomised controlled trial

Ka Ming Chow<sup>a,\*</sup>, Carmen Wing Han Chan<sup>a</sup>, Debra Jane Anderson<sup>b</sup>, Janine Porter-Steele<sup>c</sup>, Alice Wai Yi Leung<sup>a</sup>, Bernard Man Hin Law<sup>a</sup>, Alexandra Leigh McCarthy<sup>d</sup>

<sup>a</sup> The Nethersole School of Nursing, The Chinese University of Hong Kong, Hong Kong SAR, China

<sup>b</sup> Faculty of Health, University of Technology Sydney, Australia

<sup>c</sup> The Wesley Hospital Choices Cancer Support Program (Choices), Wesley Hospital, Brisbane, Australia

<sup>d</sup> School of Nursing, Midwifery and Social Work, The University of Queensland and Mater Health Services, Australia



## ARTICLE INFO

## Keywords:

eHealth  
Gynaecological cancer  
Lifestyle intervention  
Women wellness  
Health-related quality of life  
Anxiety  
Depression  
Self-efficacy

## ABSTRACT

**Objective:** To assess the feasibility and acceptability of a culturally-adapted Women's Wellness After Cancer Programme (WWACPHK) for improving health-related quality of life, anxiety and depressive symptoms and enhancing self-efficacy in engaging in healthy lifestyles among Chinese women treated for gynaecological cancer.

**Methods:** This pilot randomised controlled trial was conducted from May to December 2018. Twenty-six women aged 18 or above who had completed treatment for gynaecological cancer were recruited from a gynaecology outpatient clinic of a public hospital in Hong Kong. They were randomised into intervention (n = 15) or control (n = 11) groups. All data collectors were blinded to the group allocation. Intervention participants were given access to the WWACPHK website and an online discussion forum facilitated by a trained research nurse for 12 weeks, while control participants received standard care. Trial feasibility was assessed by recruitment, consent, and retention rates and website use. Acceptability was explored through semi-structured interviews. Additionally, we trialed the data collection procedure and collected preliminary data on health-related quality of life, anxiety and depressive symptoms, dietary and exercise self-efficacy.

**Results:** Of the 26 participants (Median age = 53.5 years) randomised, three participants dropped out of the study. Recruitment, consent and retention of participants and website use were satisfactory. No posting was made on the discussion forum. The intervention participants (n = 13) exhibited significantly greater improvement than the controls (n = 10) in perceived self-efficacy in adhering to an exercise routine at post-intervention (Cohen's d effect size(d) = 1.06, 95% confidence interval (CI): 0.18, 1.92) and 12-weeks after completion (d = 1.24, 95% CI: 0.32, 2.13). All participants were satisfied with the intervention.

**Abbreviations:** CONSORT, Consolidated Standards of Reporting Trials; EHSES, Eating Habits Self-Efficacy Scale; ESES, Exercise Self-Efficacy Scale; FACT-G, Functional Assessment of Cancer Therapy-General; GC, Gynaecological Cancer; HADS, Hospital Anxiety and Depression Scale; HRQoL, Health-Related Quality of Life; QoL, Quality of Life; WWACP, Women's Wellness After Cancer Programme; WWACPHK, Women's Wellness After Cancer Programme Hong Kong.

\* Corresponding author.

E-mail address: [kmchow@cuhk.edu.hk](mailto:kmchow@cuhk.edu.hk) (K.M. Chow).

<https://doi.org/10.1016/j.heliyon.2023.e15591>

Received 10 July 2022; Received in revised form 13 April 2023; Accepted 13 April 2023

Available online 18 April 2023

2405-8440/© 2023 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**Conclusions:** The WWACPHK is feasible and acceptable to Chinese women treated for gynaecological cancer and may improve their exercise self-efficacy. A larger-scale study is required to confirm its effects. **Trial registration** <https://www.isrctn.com> identifier: ISRCTN12149499.

## 1. Introduction

Gynaecological cancer (GC) is an umbrella term for cancer of the female reproductive tract. GC, which encompasses cancers of the cervix, ovary, uterus, vagina and vulva, is one of the most common female cancers. In 2020, around 1.4 million new GC cases were reported worldwide [1] and more than 2,300 new cases of GC were reported in Hong Kong [2]. Despite its high prevalence, recent therapeutic advances have enabled better survival among GC patients. Nevertheless, women with GC face many health problems after treatment completion, which can have detrimental impacts on their quality of life (QoL). For example, patients having completed treatment are reported to suffer from psychological and physiological symptoms including depression, anxiety, distress, poor body image perception, pain, and lymphedema as a result of their various surgeries and treatment modalities [3–6]. Significantly, many patients have been reported to adopt unhealthy lifestyles, rendering them at greater risk of treatment-related chronic conditions and cancer recurrence [7,8]. For example, uterine cancer patients who completed their treatment exhibit reduced physical activity levels and commonly have poor dietary habits [9]. On the other hand, smoking and alcohol consumption are reported in recent studies as being prevalent among patients treated for GC [10–12]. These data show that lifestyle modification should be considered as a key component of survivorship care programmes for women treated for GC, and that implementation of interventions aiming to encourage these women to practice healthy lifestyles is warranted. However, a recent systematic review identified only a few lifestyle intervention trials for this patient group demonstrating favourable effects on physical functioning, QoL and physical activity behaviours [13]. The components of lifestyle interventions were either physical activity alone or a combination of diet and physical activity [13]. Considering the paucity of research in this field, more studies are warranted to confirm the benefits of lifestyle interventions in this vulnerable group.

The Women's Wellness After Cancer Programme (WWACP), was developed and trialed with Australian women previously treated for breast, blood and gynaecological cancers [14]. The aim of the WWACP was to enhance the health-related quality of life (HRQoL) of these women by coaching healthy lifestyle practices using a combination of multiple interactive and web-based strategies. The WWACP has been described in detail previously [14]. Briefly, the programme involves 12 weeks of structured, evidence-based support to facilitate a healthy lifestyle after cancer treatment. This is enabled through an electronic book (eBook), an interactive website, an online discussion forum and three virtual consultations with trained research nurses. The eBook provides participants with regularly updated health information on chronic disease prevention and healthy lifestyle practices, while the website provides an interactive platform for the self-monitoring of dietary habits and physical activity levels. The online platforms, such as virtual consultations and a discussion forum, provide advice on the development and tailoring of action plans and goal setting for the adoption of healthy lifestyles, and motivational interviewing to enhance adherence to participants' action plans.

Previous studies indicate that culturally-tailored health-promoting interventions are more likely to enable beneficial modifications in health behaviours among target audiences of various ethnicities, as well as enhancing the acceptability of the interventions [15–18]. Therefore, cultural adaptation of the WWACP is an important preliminary step for the successful implementation of the programme among Chinese GC patients post-treatment. Cultural adaptation of the WWACP in our study was guided by the framework described by Barrera and Castro [19]. The framework defines four main steps for adapting an intervention that would satisfy participants' health needs: 1) information gathering, 2) preliminary adaptation design, 3) preliminary adaptation tests and 4) adaptation refinement. The details of the first two steps are described in Supplement 1. In this paper, we report the results of step 3 preliminary adaptation test. The findings of this study will be used for adaptation refinement and the effects of the programme will be evaluated in a full-scale study in the future.

The aim of this study was to assess the feasibility and acceptability of the culturally-adapted WWACP (WWACPHK) for improving HRQoL, anxiety and depressive symptoms and enhancing self-efficacy in engaging in healthy lifestyles among Chinese women treated for GC. The objectives are listed below.

- (1) To assess the feasibility of the trial design.
- (2) To trial the data collection procedure and collect preliminary data on HRQoL, anxiety and depressive symptoms, dietary and exercise self-efficacy.
- (3) To explore participants' perceptions of the acceptability of the intervention and ways of improvement.

## 2. Methods

### 2.1. Design

This pilot study comprised a single-blind, parallel-group, randomised controlled trial complemented with intervention participant interviews. This study followed the Consolidated Standards of Reporting Trials (CONSORT) extension to randomised pilot and feasibility trials reporting guideline. Ethical approval was obtained from the institutional ethical committee. The study complied with the Declaration of Helsinki and has been registered in the ISRCTN registry (ISRCTN12149499). Written informed consent was obtained

from the participants prior to their enrolment into the study.

## 2.2. Participants

The participants were recruited between May and June 2018 via convenience sampling by a research assistant at a public hospital in Hong Kong. The criteria for inclusion included 1) women diagnosed with either cervical, ovarian, uterine, vaginal or vulva cancer as the primary cancer and had completed treatment, 2) aged 18 or above, 3) able to comprehend Chinese and communicate in Cantonese and 4) possessing a tablet computer or smartphone. Based on a previous pilot study on the same patient group [20], we set a target sample size of 30 for this pilot study.

## 2.3. Randomisation and blinding

The enrolled subjects were randomised in a 1:1 ratio into intervention or control group after baseline data collection. Group allocation was conducted by an independent statistician using computer-generated random numbers prepared in advance. Sealed envelopes were used to ensure allocation concealment. All data collectors were blinded to this group allocation. However, the participants were not blinded due to the nature of the intervention.

## 2.4. Intervention

The intervention group followed the WWACPHK, where they were given access to the website including the eBook and a discussion forum facilitated by a trained research nurse for 12 weeks. The control participants were provided with standard care, where they received health information in general from healthcare professionals on diet, physical activity and risks of increased alcohol consumption during clinic visits. Upon completion of the study, an electronic copy of the eBook was available to all control participants.

## 2.5. Measurements

### 2.5.1. Feasibility

We assessed feasibility with the following indicators: (1) recruitment rate: the number of participants recruited per month; (2) consent rate: the number of participants provided consent divided by total number of eligible participants; (3) retention rate: the number of participants included in the analysis of the intervention outcomes divided by the number of participants randomised; (4) record of any adverse events; (5) use of the website: mean total visits per participants and total number of unique page views among the intervention participants.

### 2.5.2. Intervention outcomes

HRQoL was assessed using the Traditional Chinese version of Functional Assessment of Cancer Therapy-General (FACT-G). The validity and reliability of FACT-G had previously been established, and it has long been widely used in clinical studies to evaluate patients' QoL, including patients treated for cancer [21,22]. Previously, Yu et al. [23] had translated the instrument into Traditional Chinese and the translated version was demonstrated to have good reliability (Cronbach alpha = 0.85) among Chinese patients in Hong Kong. It consists of four domains of well-being (physical, social, emotional and functional), and the summation of scores obtained from these four domains yields a FACT-G total score, where a higher score indicates a better overall HRQoL.

Levels of anxiety and depressive symptoms were measured using the Chinese version of the Hospital Anxiety and Depression Scale (HADS). The instrument was shown to be valid for measuring the severity of psychological symptoms [24]. The Chinese version of the scale is considered a valid and reliable instrument for assessing anxiety and depression in Chinese populations [25]. The instrument has seven items rated on a 4-point Likert scale that measure anxiety and depressive symptoms, where a higher score indicates a higher level of anxiety or depressive symptoms.

The perceived self-efficacy of the participants in adhering to healthy diet and exercise routines was determined via the 30-item Eating Habits Self-efficacy Scale (EHSES) and 18-item Exercise Self-efficacy Scale (ESES) developed by Bandura [26]. The participants rated each item on a scale of 0–100, and the overall score was obtained by taking the average of the ratings of all items, with higher scores indicating better self-efficacy. Both instruments have been found to be valid and reliable measures [27,28] but there is no Chinese version available. Translation was conducted using the Brislin model of translation and guidelines for cross-cultural adaptation of scales [29,30]. The psychometric properties of the Chinese EHSES and ESES were tested in this study. Both scales demonstrated high content validity (content validity index: 0.83 to 1.0) and high internal consistency (Cronbach alpha: 0.98 to 0.99). Regarding convergent validity, the Chinese EHSES showed a moderate correlation ( $r = 0.66, p < .001$ ) with the Chinese version of the Cardiac Diet Self-Efficacy Scale [31] while the Chinese ESES showed a strong correlation ( $r = 0.84, p < .001$ ) with the Chinese Self-Efficacy for Exercise Scale [32].

### 2.5.3. Acceptability

We explored the acceptability of the intervention through semi-structured interviews with all intervention completers. All interviews were conducted by a research assistant using an interview guide (Supplement 2).

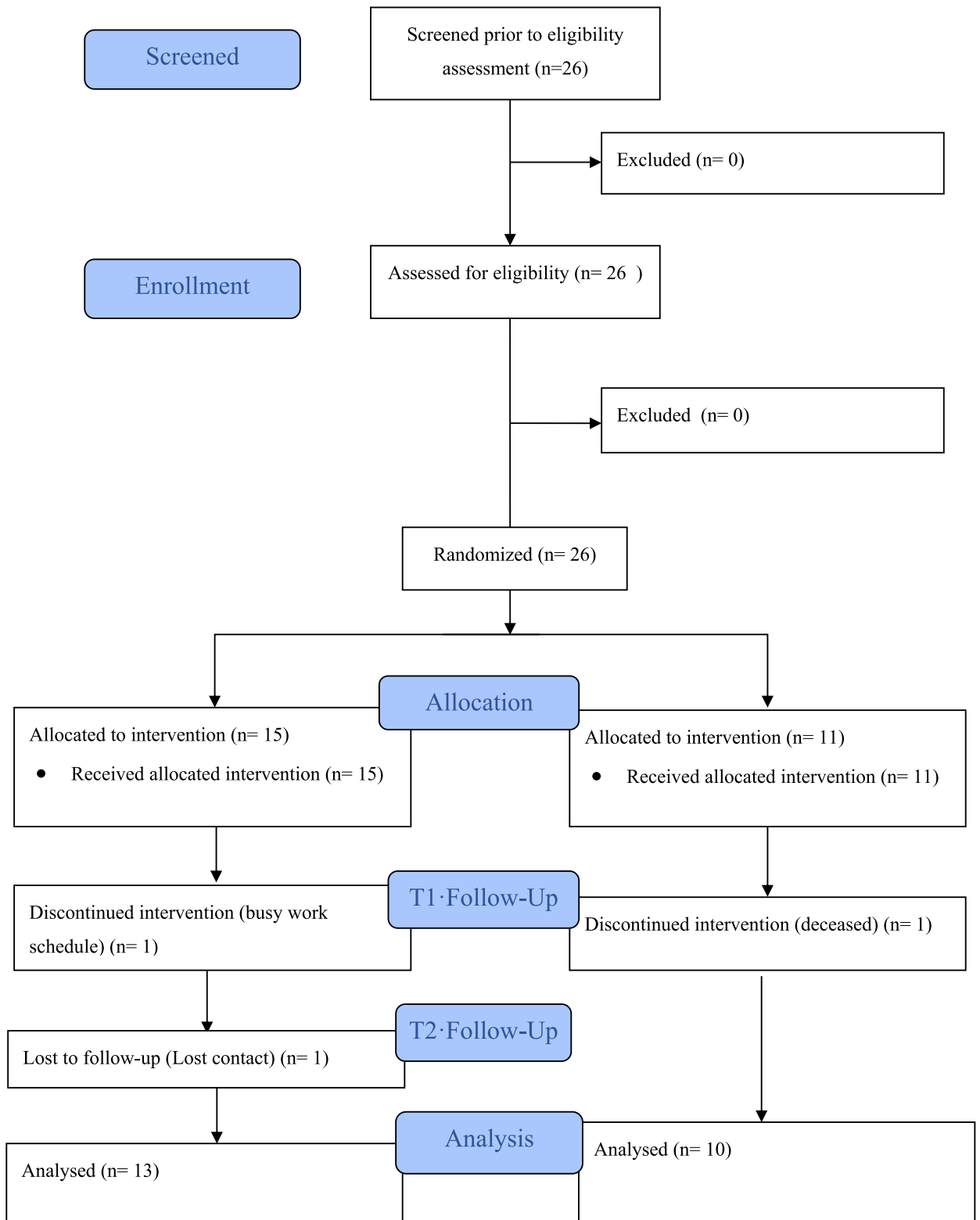


Fig. 1. CONSORT flow diagram of the study. T1: Immediate post-intervention; T2: 12 weeks post-intervention.

## 2.6. Data collection

Quantitative data collection was conducted by a research assistant at baseline (T0), immediately post-intervention (T1) and 12 weeks post-intervention (T2). Demographic data were collected at T0. Data for the outcome variables were collected at T0, T1 and T2 via a set of aforementioned instruments. As regards the use of the website and discussion forum, the total number of visits per user, the number of unique page views, and number of postings on the discussion forum were extracted from the user logs on the server. Upon completion of the study, each participant received a cash incentive of HK\$200.

Qualitative data were collected by a research assistant at T1 via individual, audio-recorded semi-structured interviews, primarily enquiring the participants' views and opinions about the WWACPHK. These interviews lasted for 20–30 min over the telephone.

## 2.7. Data analysis

In view of the difficulty of assessing the normality of the continuous variables in the study because of small sample size, all inferential analyses were conducted using non-parametric tests. Intention-to-treat principle was not followed considering that the missing data was less than 20% [33] and that our pilot study was not a hypothesis testing study. Baseline characteristics between the intervention and control groups were compared using Mann-Whitney, chi-square and Fisher's exact tests, as appropriate. Mann-Whitney test and Cohen's d effect size, respectively, were used to compare and quantify the changes in outcomes at T1 and T2 with respect to T0 between the intervention and control groups. With reference to the benchmarks proposed by Cohen [34], effect size was interpreted as small ( $d = 0.2$ ), medium ( $d = 0.5$ ) and large ( $d = 0.8$ ). All quantitative data analyses were performed using the IBM SPSS 28.0 (IBM Corp., Armonk, NY). All the statistical tests were two-sided with level of significance set at 0.05.

The audio recordings from the interviews were transcribed verbatim. The statements were read and re-read to understand the major issues pertaining to two broad categories: 1) perceived effects of the WWACPHK and 2) their impression of the programme. The

**Table 1**

Baseline characteristics of the participants in the study.

Characteristics	Control (n = 11)		Intervention (n = 15)		p value <sup>a</sup>
	Mdn or N	IQR or %	Mdn or N	IQR or %	
Age (years)	55	53, 63	51	40, 54	.018
Residence in Hong Kong (years)	40	18, 54	46	13, 54	.838
Education level					.089
Primary school or below	3	27.3%	0	0.0%	
Secondary school	7	63.6%	10	66.7%	
University or above	1	9.1%	5	33.3%	
Monthly family income (Hong Kong Dollars)					.011
<10,000	6	54.5%	1	6.7%	
10,000–19,999	4	36.4%	4	26.7%	
20,000–29,999	1	9.1%	6	40.0%	
≥30,000	0	0.0%	4	26.7%	
Marital status					.999
Married	8	72.7%	12	80.0%	
Single/divorced/widowed	3	27.3%	3	20.0%	
Number of children					.667
0	2	18.2%	4	26.7%	
1	3	27.3%	6	40.0%	
2	5	45.5%	5	33.3%	
3	1	9.1%	0	0.0%	
Religious belief					.683
No	7	63.6%	11	73.3%	
Yes	4	36.4%	4	26.7%	
Type of gynecological cancer diagnosed					.517
Cervical cancer	2	18.2%	6	40.0%	
Uterine cancer	7	63.6%	7	46.7%	
Ovarian cancer	2	18.2%	1	6.7%	
Others	0	0.0%	1	6.7%	
Stage of cancer					.126
I	6	54.5%	11	73.3%	
II	3	27.3%	0	0.0%	
III	2	18.2%	2	13.3%	
Do not know	0	0.0%	2	13.3%	
Types of treatment modalities received					.234
Surgery only	8	72.7%	10	66.7%	
Surgery + chemotherapy	2	18.2%	0	0.0%	
Surgery + radiotherapy	0	0.0%	2	13.3%	
Surgery + chemotherapy + radiotherapy	1	9.1%	3	20.0%	

Abbreviations: IQR: Interquartile range; Mdn: Median.

<sup>a</sup> Variables were compared between the two groups using Mann-Whitney, chi-square and Fisher's exact test, as appropriate.

significant statements were identified and coded based on the issues reported in them, and statements with the same code were grouped together in these categories. The categories and statements were translated from Traditional Chinese into English.

### 3. Results

#### 3.1. Feasibility

Between May 1 and June 5, 2018, 26 Hong Kong women who had completed GC treatment were recruited and randomised into intervention (n = 15) and control (n = 11) groups. Due to budget constraints and taking into consideration that 26 participants was adequate in a previous pilot study on the same patient group [20], we ended our recruitment early. The recruitment rate was approximately 20 participants per month while the consent rate was 100%. Baseline data were collected from all participants. At T1, one intervention participant withdrew from the study due to conflicting work commitments and one control participant died. At T2, one intervention participant was lost to follow-up, leaving 13 intervention and 10 control participants completing all follow-up assessments. The final sample included in this preliminary analysis was 23 resulting in a retention rate of 88.5%. Fig. 1 shows a CONSORT diagram depicting the flow of the study. No adverse events were reported during the study period.

Table 1 summarises the participants' demographic and clinical characteristics. Overall, no significant differences in the demographic and clinical characteristics were observed between the groups at baseline, except that the intervention participants were significantly younger and had a higher income than their control counterparts.

Regarding the use of the website, all of the participants (n = 15) logged into the website more than once. The mean total visits were  $40.5 \pm 21.1$  times, and the total number of unique page views was 3,646 among the 15 participants during the intervention period. No posting was made in the discussion forum during the study period.

#### 3.2. Preliminary effects of the WWACPHK

Table 2 presents a summary of the changes in all outcomes and effect size. The intervention group demonstrated a significantly greater improvement in ESES scores with a large effect size at T1 (d = 1.06, 95% CI: 0.18, 1.92) and T2 (d = 1.24, 95% CI: 0.32, 2.13). On the other hand, there was a trend towards a significant difference in the changes of EHSES scores with a medium effect size at T1 (d = 0.66, -0.19, 1.48), and T2 (d = 0.71, 95% CI: -0.15, 1.56), as well as the changes of the FACT-G functional sub-scale scores with a small effect size at T1 (d = 0.11, 95% CI: -0.92, 0.70) and T2 (d = 0.40, 95% CI: -0.94, 0.71).

#### 3.3. Acceptability

All intervention completers were interviewed, where they expressed their views on the perceived benefits and impression of the programme. Table 3 summarises the categories, codes and sample quotes.

##### 3.3.1. Perceived benefits of the WWACPHK

The majority of the interviewed participants indicated that the WWACPHK had helped them become more aware of strategies for health promotion during cancer survivorship. They stated that the programme provided useful health information that increased their

**Table 2**  
Summary of the changes in outcomes and effect size.

Questionnaire	Intervention group (n = 14)		Control group (n = 10)		ES (95%CI)	Intervention group (n = 13)		Control group (n = 10)		ES (95%CI)
	T1-T0		T1-T0			T2-T0		T2-T0		
	Mdn	IQR	Mdn	IQR		Mdn	IQR	Mdn	IQR	
FACT-G (physical)	0	-1.5, -3	0	-0.8, 2.3	-0.11 (-0.92, 0.70)	0	-3, 3	1.5	-3, 3	-0.12 (-0.94, 0.71)
FACT-G (social/ family)	0.5	-0.5, 4.1	3.5	0, 7.3	-0.24 (-1.05, 0.58)	0	-2.7, 3.2	1.2	-1.2, 6	-0.16 (-0.98, 0.67)
FACT-G (emotional)	0	-3.0, 1.3	0	-1, 2.5	-0.48 (-1.3, 0.35)	0	-1.5, 1.5	0.5	-1, 1.8	-0.42(-1.25,0.42)
FACT-G (functional)	2	-1.0, 5	-0.5	-1.3, 2.5	0.11 (-0.71, 0.92)	2	0.5, 5.0	2	-3, 4	0.40 (-0.44, 1.23)
FACT-G (total score)	2.6	-1.8, 10.6	4.8	-1.7, 11.9	-0.21 (-1.03, 0.60)	2	-2.7, 10.7	4.4	-1.3, 9.5	-0.05 (-0.87, 0.78)
HADS - anxiety	0	-2.3, 1.3	-1.0	-2.3, 0	-0.42 (-1.23, 0.41)	0	-0.5, 1.5	-2	-2.3, -0.8	-0.50 (-1.33, 0.34)
HADS - depression	0.5	-3.3, 2.3	0	-1, 0.3	-0.11 (-0.82, 0.80)	1	-1.5, 3	-1	-1, 2	-0.01 (-0.83, 0.82)
ESES	6.9	1.1, 18.1	0	-3.5, 0	1.06 (0.18, 1.92)**	15.6	2.8, 25	-5.3	-17.1, 1.8	1.24 (0.32, 2.13)*
EHSES	2.5	0, 7.5	0	0.6, 1.4	0.66 (-0.19, 1.48)	2.7	0.2, 13	-1.8	-2.8, 1.4	0.71 (-0.15, 1.56)

Abbreviations: EHSE, Eating Habits Self-efficacy Scale; ESES, Exercise Self-efficacy Scale; FACT-G, Functional Assessment of Cancer Therapy-General; HADS, Hospital Anxiety and Depression Scale; IQR: Interquartile range; Mdn: Median; T1: Immediately post-intervention; T2: 12 weeks post-intervention. ES: Cohen's d effect size (positive ES favors intervention and vice versa); \*p < .01; \*\*p < .001.

**Table 3**  
Categories, codes and sample quotes.

Category	Code	Sample quote
Perceived benefits of the WWACPHK	Useful health-promoting information	<i>'It enables my comprehensive understanding of various aspects. For example, it provides dietary recommendations, such as what type of food should be consumed, and what should not be consumed. I have now got a better understanding of this aspect.'</i> (P03) <i>'I now pay more attention to improving my diet and choosing healthy foods for my consumption. I have also become more aware of how to increase my physical activity level to boost my physical and spiritual health.'</i> (P08) <i>'In the past, I did not do much physical exercise. Nowadays, I feel that I should do exercises regularly, at least three times a week for more than 30 min. I get myself to do more exercises.'</i> (P10)
	New knowledge	<i>'I have acquired new knowledge, as some of the information [presented in the programme] was unknown to me in the past.'</i> (P06) <i>'I now know that the pelvic floor exercises have to be performed in this way [as presented in the programme]. Nobody had ever taught me that such exercises have to be performed this way.'</i> (P08) <i>'I now know that we need to do sunbathing at a time when the ultraviolet rays are less strong, which helps our body absorb calcium. We need vitamin D to aid calcium absorption. Actually, I was not aware of this fact before.'</i> (P08)
	Positive lifestyle changes	<i>'For example, when I was watching television at home after work, I realised that I actually do not need to watch so much television. I could instead take a stroll downstairs ... and do some physical exercises that suit me ... Although I am not able to jog, I still take a stroll more regularly, or do brisk walking.'</i> (P07) <i>'Now, at least I follow the recommendations made, to consume two servings of fruits every day. I also consume a greater variety of vegetables ... Now I consume [healthy] foods that I did not consume in the past.'</i> (P09)
	Coping	<i>'It has also helped me gain a better understanding of my disease. For example, there is a part indicating that patients are at risk of developing lymphedema after surgery. Doing physical exercises is a good way to relieve swelling and other discomfort ... I never knew that surgery would cause such effects ...'</i> (P08) <i>'I have got more information about my disease. I feel less worried about it.'</i> (P15)
Impression of the WWACPHK	Satisfied with the programme	<i>'The information is presented in a systematic way. It gives patients a step-by-step guide and clear instructions, teaching us how we should modify our lifestyle, so that we assimilate the information quickly.'</i> (P02) <i>'The information is presented point-by-point. It is very clear.'</i> (P07) <i>'I feel that the idea of giving us a record chart is good. It helps me to remind myself "Oh, I may have failed to do so these last few days!"'</i> (P12)

awareness of how to lead a healthy life after cancer treatment, where such information had even led to their increased intention to modify their lifestyles through the intake of a healthier diet and doing more physical exercises. Specifically, some participants expressed that they had acquired new knowledge on health promotion that had been unknown to them prior to participating in the programme.

As a result of the participants' increased awareness of the importance of healthy lifestyle adoption during cancer survivorship, they expressed that the WWACPHK had induced positive changes in their lifestyle practices.

Apart from having a better understanding of the strategies for adopting a healthy lifestyle, some participants expressed that the information about cancer helped them cope with adverse treatment effects at post-treatment and relieved their worries.

### 3.3.2. Impression of the WWACPHK

All of the interviewed participants indicated that they were satisfied with the programme, in that it provided useful information on strategies for improving their well-being during cancer survivorship. Specifically, some participants were impressed with the clarity and comprehensiveness of the information, and felt that the information was presented in a way that enhanced their learning. Moreover, one participant expressed appreciation for the opportunity for participants to record their daily dietary intake and physical activity levels, which encouraged them to review their performance in healthy lifestyle adoption.

## 4. Discussion

To the best of our knowledge, this was the first study to assess the feasibility and acceptability of implementing, in a Chinese setting, a culturally-adapted wellness programme for Chinese women who had completed GC treatment to adopt healthy lifestyles for health promotion in Hong Kong. The programme was associated with improvements in participants' perceived self-efficacy in modifying their sedentary behaviours with a large effect size. Additionally, the intervention group demonstrated better trends of improvement in functional well-being with a small effect size and perceived self-efficacy in adhering to a healthy diet with a medium effect size. The qualitative data also revealed that the programme had enhanced the participants' knowledge and awareness of health behaviours and induced positive changes in their lifestyle practices. Moreover, as use of the website was satisfactory and all participants were satisfied with the programme, the intervention is likely to be welcomed, feasible and acceptable to future participants.

With the demonstration of the feasibility and acceptability of the WWACPHK in this feasibility study, a larger-scale randomised controlled trial study should be conducted to explore whether this programme exhibits any beneficial effect on the health outcomes of Chinese women treated for GC, using a larger and more representative sample. According to the procedures set out in the Barrera-Castro framework [19], modifications of the programme should be made based on the participants' comments on the programme materials and their utilisation, prior to the implementation of the trial. Notably, we found that no posting was recorded in the discussion forum during the intervention period, which corroborates the finding in the WWACP full trial in Australia [35]. In view of the

redundancy of the discussion forum in the programme, the forum would be removed from the programme during the implementation of the larger-scale trial.

Similar to the WWACP full trial, we did not observe a beneficial effect of the intervention on almost all FACT-G scores post-intervention and 12 weeks after. However, in the WWACP full trial, the intervention group demonstrated significant improvement in HRQoL, as measured by Medical Outcomes Study Short-Form 36-Item (MOS-SF36) questionnaire [36]. For this reason, we consider MOS-SF36 to be a more valid instrument, as compared to FACT-G, in women who have completed treatment. In the WWACP full-scale study, the number of stressful life events was shown to have positive relationships with anxiety scores measured by the 20-item Zung Self-rating Anxiety Scale (SAS) and depressive symptoms measured by the 20-item Center for Epidemiologic Studies Depression Scale (CES-D) among WWACP participants at baseline [35]. However, survey burden needs to be considered in similar studies. These are two 20-item questionnaires, and in addition to the 36-item MOS-SF36, are likely to place a significant survey burden on participants. To reduce survey burden, we decided to reduce the number of instruments and a literature review indicated that substituting the SAS and CES-D for a single item Distress Thermometer (DT) [37] in subsequent studies is likely to provide equally robust and meaningful data for our purposes.

Upon the demonstration of the effectiveness of the WWACPHK in improving health outcomes among Chinese patients treated for GC in a full trial, this programme can be further adapted and developed for implementation among cancer patients treated for other cancer types that are prevalent among women in Hong Kong, such as breast and colorectal cancers. Health information pertaining to the management of these specific cancer types and strategies of health promotion for preventing the recurrence of these cancers would be included in the programme materials.

This study has few limitations. First, the small sample size ( $N = 26$ ) while normal for a feasibility study, means that the clinical outcomes are not truly generalisable and should be interpreted with caution [38]. Second, convenience sampling was used for subject recruitment, a strategy that could lead to selection bias. Third, the outcome measurements primarily relied upon self-report instruments. As their use is prone to generate reporting bias [39], the reported effect in this study might not reflect the real effect of the WWACPHK. Future trials should therefore consider the use of objective measurements for data collection, such as image-assisted food recording [40] and wearable activity trackers [41]. These objective measurements would ultimately provide more reliable data on the effectiveness of the cultural adaptation of the WWACP. Fourth, all analyses were not adjusted for potential covariates due to the small sample size. Last but not least, behavioural and knowledge outcomes were not measured in the quantitative study such that we cannot rule out the confounding of baseline differences in lifestyle behaviours and relevant knowledge.

## 5. Conclusions

Our study demonstrated the feasibility of implementing a women's wellness programme among Hong Kong women having completed GC treatment for the promotion of health and well-being, and the acceptability of the programme, which had been adapted to meet the cultural needs of Hong Kong Chinese. Although the programme exhibited no effect in alleviating the participants' psychological symptoms and improving their HRQoL, it appeared effective in enhancing their self-efficacy to adopt healthy lifestyles through modification of their dietary and sedentary behaviors. A larger-scale trial will be conducted to test its effects. We will also expand the usage of WWACPHK to women treated for other cancers to improve their outcomes.

### Author contribution statement

Ka Ming Chow; Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Carmen W.H. Chan, Debra J. Anderson, Janine Porter-Steele: Conceived and designed the experiments.

Alice W.Y. Leung, Bernard M.H. Law: Analyzed and interpreted the data; Wrote the paper.

Alexandra L. McCarthy: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data.

### Data availability statement

Data will be made available on request.

### Ethical statement

Ethical approval was obtained from The Joint Chinese University of Hong Kong – New Territories East Cluster Clinical Research Ethics Committee (CREC Ref no: 2017-692). The study complied with the Declaration of Helsinki. Written informed consent was obtained from the participants prior to their enrolment into the study.

### Funding Statement

This study was supported by the Nethersole School of Nursing, Faculty of Medicine, The Chinese University of Hong Kong.



## Declaration of competing interest

The authors declare no conflict of interest.

## Acknowledgments

The authors would like to thank the participants of the study.

## Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.heliyon.2023.e15591>.

## References

- [1] International Agency for Research on Cancer, Cancer Fact Sheets, 2020. <https://gco.iarc.fr/today/fact-sheets-cancers>. accessed.
- [2] Hong Kong Cancer Registry, Cancer Facts, 2020. <https://www3.ha.org.hk/cancereg/facts.html>. accessed.
- [3] K.C. Bisseling, S. Kondalsamy-Chennakesavan, R.L. Bekkers, M. Janda, A. Obermair, Depression, anxiety and body image after treatment for invasive stage one epithelial ovarian cancer, *Aust. N. Z. J. Obstet. Gynaecol.* 49 (6) (2009) 660–666.
- [4] J. Hanprasertpong, A. Geater, I. Jiamset, L. Padungkul, P. Hirunkajonpan, N. Songhong, Fear of cancer recurrence and its predictors among cervical cancer survivors, *J Gynecol Oncol* 28 (6) (2017) e72.
- [5] S. Watts, P. Prescott, J. Mason, N. McLeod, G. Lewith, Depression and anxiety in ovarian cancer: a systematic review and meta-analysis of prevalence rates, *BMJ Open* 5 (11) (2015), e007618.
- [6] E.L. Krakauer, X. Kwete, K. Kane, G. Afshan, L. Bazzett-Matabele, D.D.R. Bien-Aimé, Cervical cancer-associated suffering: estimating the palliative care needs of a highly vulnerable population, *JCO Glob Oncol* (7) (2021) 862–872.
- [7] K.Y. Lin, L. Edbrooke, C.L. Granger, L. Denehy, H.C. Frawley, The impact of gynaecological cancer treatment on physical activity levels: a systematic review of observational studies, *Braz. J. Phys. Ther.* 23 (2) (2019) 79–92.
- [8] Z. Cao, C. Xu, H. Yang, S. Li, Y. Wang, The role of healthy lifestyle in cancer incidence and temporal transitions to cardiometabolic disease, *JACC (J. Am. Coll. Cardiol.)*: CardioOncology 3 (5) (2021) 663–674.
- [9] V.E. von Gruenigen, S.E. Waggoner, H.E. Frasure, M.B. Kavanagh, J.W. Janata, P.G. Rose, K.S. Courneya, E. Lerner, Lifestyle challenges in endometrial cancer survivorship, *Obstet. Gynecol.* 117 (1) (2011) 93–100.
- [10] H. Arem, S.K. Mama, X. Duan, J.H. Rowland, K.M. Bellizzi, D.K. Ehlers, Prevalence of healthy behaviors among cancer survivors in the United States: how far have we come? *Cancer Epidemiol. Biomarkers Prev.* 29 (6) (2020) 1179.
- [11] N.S. Iyer, K. Osann, S. Hsieh, J.A. Tucker, B.J. Monk, E.L. Nelson, L. Wenzel, Health behaviors in cervical cancer survivors and associations with quality of life, *Clin. Therapeut.* 38 (3) (2016) 467–475.
- [12] B. Park, S.I. Kim, S.-S. Seo, S. Kang, S.-Y. Park, M.C. Lim, Health behaviors and associated sociodemographic factors in cervical cancer survivors compared with matched non-cancer controls, *PLoS One* 11 (8) (2016), e0160682.
- [13] V.L. Beesley, C. Alemanyeh, P.M. Webb, A systematic literature review of trials of survivorship interventions for women with gynaecological cancer and their caregivers, *Eur. J. Cancer Care* 28 (3) (2019), e13057.
- [14] D. Anderson, C. Seib, D. Tjondronegoro, J. Turner, L. Monterosso, A. McGuire, The Women's Wellness after Cancer Program: a multisite, single-blinded, randomised controlled trial protocol, *BMC Cancer* 17 (1) (2017) 98.
- [15] D.N. Chan, W.K. So, A systematic review of randomised controlled trials examining the effectiveness of breast and cervical cancer screening interventions for ethnic minority women, *Eur. J. Oncol. Nurs.* 19 (5) (2015) 536–553.
- [16] S. Henderson, E. Kendall, L. See, The effectiveness of culturally appropriate interventions to manage or prevent chronic disease in culturally and linguistically diverse communities: a systematic literature review, *Health Soc. Care Community* 19 (3) (2011) 225–249.
- [17] J. Liu, E. Davidson, R. Bhopal, M. White, M. Johnson, G. Netto, M. Deverill, A. Sheikh, Adapting health promotion interventions to meet the needs of ethnic minority groups: mixed-methods evidence synthesis, *Health Technol. Assess.* 16 (44) (2012) 1–469.
- [18] L. Vincze, K. Barnes, M. Somerville, R. Littlewood, H. Atkins, A. Rogany, L.T. Williams, Cultural adaptation of health interventions including a nutrition component in Indigenous peoples: a systematic scoping review, *Int. J. Equity Health* 20 (1) (2021) 125.
- [19] M.J. Barrera, F.G. Castro, A heuristic framework for the cultural adaptation of interventions, *Clin. Psychol. Sci. Pract.* 13 (4) (2006) 311–316.
- [20] K.M. Chow, C.W.H. Chan, J.C.Y. Chan, K.C. Choi, K.Y. Siu, A feasibility study of a psychoeducational intervention program for gynecological cancer patients, *Eur. J. Oncol. Nurs.* 18 (4) (2014) 385–392.
- [21] D.F. Cella, D.S. Tulsky, G. Gray, B. Sarafian, E. Linn, A. Bonomi, M. Silberman, S.B. Yellen, P. Winicour, J. Brannon, The Functional Assessment of Cancer Therapy scale: development and validation of the general measure, *J. Clin. Oncol.* 11 (3) (1993) 570–579.
- [22] H. Becker, S.J. Kang, A. Stuifbergen, Predictors of quality of life for long-term cancer survivors with preexisting disabling conditions, *Oncol. Nurs. Forum* 39 (2) (2012) E122–E131.
- [23] C.L. Yu, R. Fielding, C.L. Chan, V.K. Tse, P.H. Choi, W.H. Lau, D.T. Choy, S.K. O, A.W. Lee, J.S. Sham, Measuring quality of life of Chinese cancer patients: a validation of the Chinese version of the Functional Assessment of Cancer Therapy-General (FACT-G) scale, *Cancer* 88 (7) (2000) 1715–1727.
- [24] A.S. Zigmund, R.P. Snaith, The hospital anxiety and depression scale, *Acta Psychiatr. Scand.* 67 (6) (1983) 361–370.
- [25] Q. Li, Y. Lin, C. Hu, Y. Xu, H. Zhou, L. Yang, Y. Xu, The Chinese version of hospital anxiety and depression scale: psychometric properties in Chinese cancer patients and their family caregivers, *Eur. J. Oncol. Nurs.* 25 (2016) 16–23.
- [26] A. Bandura, Guide for constructing self-efficacy scales, in: F. Pajares, T. Urdan (Eds.), *Self-efficacy Beliefs of Adolescents*, Information Age, Greenwich, CT, 2006, pp. 307–377.
- [27] S.M. Glynn, A.J. Ruderman, The development and validation of an eating self-efficacy scale, *Cognit. Ther. Res.* 10 (4) (1986) 403–420.
- [28] T. Kroll, M. Kehn, P.S. Ho, S. Groah, The SCI Exercise Self-Efficacy Scale (ESES): development and psychometric properties, *Int. J. Behav. Nutr. Phys. Activ.* 4 (2007) 34.
- [29] R.W. Brislin, Back-translation for cross-cultural research, *J. Cross Cult. Psychol.* 1 (3) (1970) 185–216.
- [30] R.W. Brislin, The wording and translation of research instruments, in: W.L. Lonner, J.W. Berry (Eds.), *Field Methods in Cross-Cultural Research* Sage, 1986, pp. 137–164. Newbury Park, CA.
- [31] S. Chen, J. Shao, Translation and testing of the cardiac diet self-efficacy scale for use with Taiwanese older adults, *Publ. Health Nurs.* 26 (5) (2009) 474–482.
- [32] E.M.L. Wong, D.Y.P. Leung, J.W.H. Sit, A.W.K. Chan, S.Y. Chair, Respective validation of the Chinese version of the Self-Efficacy for Exercise Scale among middle-aged patients with coronary heart disease, *Rehabil. Nurs.* 45 (2) (2020) 74–79.
- [33] K.F. Schulz, D.A. Grimes, Sample size slippages in randomised trials: exclusions and the lost and wayward, *Lancet* 359 (9308) (2002) 781–785.

- [34] J. Cohen, *Statistical Power Analysis for the Behavioral Sciences*, second ed., Lawrence Erlbaum Associates Hillsdale, N.J, 1988.
- [35] C. Seib, A. McCarthy, A. McGuire, J. Porter-Steele, S. Balaam, R.S. Ware, D. Anderson, Exposure to stress across the life course and its association with anxiety and depressive symptoms: results from the Australian Women's Wellness after Cancer Program (WWACP), *Maturitas* 105 (2017) 107–112.
- [36] C. Seib, D. Anderson, A. McGuire, J. Porter-Steele, N. McDonald, S. Balaam, D. Sapkota, A.L. McCarthy, Improving health-related quality of life in women with breast, blood, and gynaecological cancer with an eHealth-enabled 12-week lifestyle intervention: the Women's Wellness after Cancer Program randomised controlled trial, *BMC Cancer* 22 (1) (2022) 747.
- [37] X. Ma, J. Zhang, W. Zhong, C. Shu, F. Wang, J. Wen, M. Zhou, Y. Sang, Y. Jiang, L. Liu, The diagnostic role of a short screening tool—the distress thermometer: a meta-analysis, *Support. Care Cancer* 22 (7) (2014) 1741–1755.
- [38] J. Faber, L.M. Fonseca, How sample size influences research outcomes, *Dental Press J Orthod* 19 (4) (2014) 27–29.
- [39] C. Cook, Mode of administration bias, *J. Man. Manip. Ther.* 18 (2) (2010) 61–63.
- [40] C.J. Boushey, M. Spoden, F.M. Zhu, E.J. Delp, D.A. Kerr, New mobile methods for dietary assessment: review of image-assisted and image-based dietary assessment methods, *Proc. Nutr. Soc.* 76 (3) (2017) 283–294.
- [41] T. Ferguson, T. Olds, R. Curtis, H. Blake, A.J. Crozier, K. Dankiw, D. Dumuid, D. Kasai, E. O'Connor, R. Virgara, C. Maher, Effectiveness of wearable activity trackers to increase physical activity and improve health: a systematic review of systematic reviews and meta-analyses, *The Lancet Digital Health* 4 (8) (2022) e615–e626.